

SUBMISSION FROM THE INTER-AMERICAN INSTITUTE FOR GLOBAL CHANGE RESEARCH

Further to FCCC/SBSTA/2007/4 paragraphs 47 a-f, inviting research organizations to regularly inform the SBSTA on developments in research activities, and to our contribution to the UNFCCC Workshop on technical and scientific aspects of ecosystems with high-carbon reservoirs not covered by other agenda items under the Convention, held in Bonn last October, the Inter-American Institute for Global Change Research (IAI), here presents emerging findings from its collaborative research network on human, ecological and biophysical dimensions of tropical dry forests (Tropi-Dry, <http://www.tropi-dry.eas.ualberta.ca>).

The Tropi-Dry team of researchers from Brazil, Canada, Costa Rica, Mexico, and the United States of America is conducting comprehensive comparative studies of ecosystems, land use and policy in tropical dry regions. Over the past 8 years, natural and social scientists have jointly examined the functioning and management of TDF across the American continent, exploring sustainability issues and ecosystem services in this endangered ecosystem.

Tropical dry forests have multiple ecosystem services and uses, which are closely linked to human cultural and economic development. Their management and conservation needs to take these dimensions into consideration and go beyond the conservation of its biodiversity and its potential for carbon storage capacity. Lands where TDF grow are often fertile with low rates of nutrient leaching and soil development; they possess a marked rainfall seasonality that allows for short cycle crops while their dry climate limits the propagation of pathogens and insects; and their low structural complexity and above ground biomass facilitate forest clearing (Ewel, 1999, Murphy and Lugo, 1986; Fajardo et al., 2005). They are an important source of firewood, medicinal plants, shade, and animals for hunting (Castillo et al. 2005; Balvanera et al. 2011, Bye, 1995; Anaya et al., 2006). TDF that are close to coastal areas have turned into hot spots of tourism development, especially in Mesoamerica where they have attracted investment by mega-tourism corporations.

Deforestation for wood, charcoal and agricultural development continues due to the forests' low level of protection and limited international attention to its ecosystems services and attributes. While protected areas of humid forests amount to 1.5 million km² or 25% of their total extent (Scharlemann et al. 2010), only 23,417 Km² (4.5 %) of TDF in the Americas fall within any level of legal protection (Portillo & Sanchez-Azofeifa, 2010). Efforts to preserve large size forest remnants in Mexico, Bolivia and Brazil or to promote conservation programs in fragmented forests elsewhere in inter-Andean valleys and the Caribbean, need to be supported by clear and solid arguments based on their: (1) high degrees of endemism, diversity of plant life forms and ecophysiological types; (2) importance for regional carbon balance and nutrient cycling; and (3) provision of ecosystem services directly related to human livelihoods. Communicating these multiple ecosystem services of TDF is crucial for building an advocacy base for this ecosystem and its long-term sustainability (Rodriguez et al. 2008).

In the last decades, researchers have pointed out the potential of TDF for carbon sequestration. Becknell et al. 2012 stated that if the world's TDF were restored the whole ecosystem would contain 22 Pg of carbon in aboveground biomass. Aboveground living biomass estimates in mature TDF range from 39 Mg ha⁻¹ in Chamela, Mexico to 334 Mg ha⁻¹ in Guanacaste, Costa

Rica (Becknell et al. 2012), but the majority of the ecosystem's carbon stock is in the soil. Geoghegan et al. 2010 estimated carbon total stocks near 400 Mg ha⁻¹ in mature TDF of the Yucatan Peninsula with 80% of those stored in the soil. However, carbon sequestration alone presents an over-simplified view of the ecosystem services TDF provide.

Approximately 66% of water reservoirs and dams in the Neotropics are located within dry or xeric ecoregions, but only 8.5% of these are protected by any of the land-use management categories identified by the IUCN. This creates important socio-economic issues as desertification increases in some TDF, and scarce water becomes a source of conflict between rural communities, large agricultural development companies, and tourism. Dry forest management and active restoration are imperative in order to secure water provision and quality for population centers.

As climate change becomes a reality, sound conservation policies and management practices are needed for this ecosystem. Across the Americas, TDF cover more than half a million Km² and are the home of close to 90 million people. Low levels of protection at national levels, a narrow focus on carbon sequestration schemes that do not account for other ecosystem services such as food and water provision, must be addressed by governments and NGOs. There is a clear need for integration of knowledge and research to provide advice for decision-making on conservation, use and management. The consequences of the over simplification of ecosystem value may be a dire future for millions of people in TDF regions.

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